THE LIVESTOCK PROTECTION COLLAR

GUY CONNOLLY, U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Denver Wildlife Research Center, P.O. Box 25266, Denver, Colorado 80225

ABSTRACT: The Livestock Protection Collar (LP Collar) is a new method for killing coyotes that prey on sheep and goats. Collars are placed on livestock that are pastured where coyotes are likely to attack. Attacking coyotes usually puncture the collars and are poisoned. This report describes the LP Collar and its use.

Predator Management in North Coastal California: proceedings of a workshop held in Ukiah and Hopland, Calif., March 10-11, 1990 (G. A. Giusti, R. M. Timm, and R. H. Schmidt, eds.). University of California, Hopland Field Station Publication 101.

The LP Collar consists of a 2 x 6-inch, inflatable rubber bladder with Velcro or elastic straps to hold the collar in place under the throat of a sheep or goat. The bladder has two compartments that contain a 1% solution of Compound 1080 (sodium fluoroacetate). Each compartment holds 15 milliliters of solution. The total amount of toxicant (active ingredient) in one collar is 300 milligrams. This collar works best on lambs and kids up to 50 pounds in size. A larger collar, for large lambs and adult sheep and goats, has been developed but has not yet been approved for field use.

Livestock Protection Collars deliver toxicant to coyotes that attack collared sheep or goats and bite into the collars. The collars do not attract coyotes, but are bitten because they are positioned on the throat where coyotes normally attack. LP Collars are ineffective against any predator that does not attack the throat. The collar is registered only for use against coyotes, and may be used only on sheep and goats.

When coyotes attack collared sheep or goats, they puncture the collars about 75% of the time. A 100% puncture rate cannot be expected because coyotes sometimes attack body sites other than the throat. In pen tests where each outcome could be determined with certainty, every coyote that punctured a Compound 1080 collar died. Times to death varied from 2 to 7 hours with an average of 4 hr 20 min. When collars were used on sheep and goat ranches, most poisoned coyotes were not found. With 1080, there is a 2-hour or longer latent period between dosing and onset of symptoms, so coyotes that puncture collars can travel several miles before they die. Coyotes killed by LP Collars have been recovered as much as 2.5 miles away from the point of attack.

Attacking coyotes usually kill and feed on collared animals just as they would on uncollared livestock. Collar users ordinarily detect coyote attacks by finding the remains of collared sheep or goats that have been killed.

HOW TO USE LIVESTOCK PROTECTION COLLARS

The LP Collar is only one of many techniques for protecting livestock from predators. Most predator control experts regard the collar as a supplement to other methods and not as a replacement for them. In general, livestock producers should consider all methods, both lethal and nonlethal, and use collars only where cheaper or easier techniques prove impractical or ineffective. LP Collars are particularly useful against coyotes that kill repeatedly in a specific pasture, and that have eluded other controls such as fences, guard dogs, traps, snares, cyanide guns, or aerial hunting.

Successful use of LP Collars requires management of all vulnerable livestock on a ranch. Most ranchers find it impractical to collar all of their sheep or goats. Instead, collars are placed on a "target" flock (50 to 100 animals, of which 20 to 50 have collars) in a high-risk pasture while other sheep and goats in the vicinity are moved away or penned at night so that coyotes will attack animals in the target flock. Because coyotes normally select lambs or kids in preference to adults, the typical target flock consists of young animals and their mothers with collars only on the young. It is desirable to add dry ewes, nannies, or wethers to increase the size of the target flock, as coyotes are better attracted to large flocks.

Each rancher considering the use of collars should decide whether or not effective targeting can be achieved in his or her operation. In some research studies, the collar technique was ineffective because coyote attacks could not be targeted to collared livestock. The main cause of ineffective targeting was failure to protect uncollared flocks adequately. In addition, targeting could not be achieved on some ranches because coyotes did not attack repeatedly in predictable locations or did not attack often enough. On most ranches, only a high frequency of predation (at least 1 attack per week) will justify spending the time and money needed to become trained and certified, purchase collars, and use them properly.

Persons who are experienced with this technique usually can evaluate local conditions quickly and decide whether or not collars will be useful. Collar targeting techniques are in their infancy and are expected to improve with experience.

The outstanding advantage of the LP Collar is its selectivity for individual coyotes that are causing damage. No other control method is completely selective for the offending individual predator. Disadvantages include the cost of collars (approximately $17 each), livestock that must be sacrificed, hazards inherent in the use of this toxic pesticide, and the costs or inconvenience of complying with use restrictions including requirements for training, certification, and record keeping.

The use of LP Collars is subject to several use restrictions that are detailed in the EPA-approved technical bulletin for your state. If your State Department of Agriculture does not have a technical bulletin, the USDA/APHIS label and technical bulletin (Connolly 1989) is available from the Denver Wildlife Research Center. In addition, an applicator training manual (Wade 1985) is available from the Texas Agricultural Extension Service. Persons considering the use of collars should consult their state agriculture department, APHIS/Animal Damage Control (ADC) offices, or the collar manufacturer (Roy McBride, Ranchers Supply, Alpine, TX 79830; phone 915-837-3630) for current information.

HISTORY AND REGISTRATION STATUS

The LP Collar was invented by Roy McBride and patented in his name by the U.S. Government in 1974. The U.S. Department of the Interior, Fish and Wildlife Service (FWS), conducted laboratory and field studies for several years to develop the collar and document its efficacy and safety. In 1981, FWS applied for Environmental Protection Agency (EPA) registration of the Compound 1080 Livestock Protection Collar. The FWS registration was granted in July 1985. It became a USDA/APHIS registration when Congress transferred the ADC program from FWS to USDA/APHIS in December 1985.

The APHIS registration provides that LP Collars may be used only by trained, certified applicators or by persons under their direct supervision. Since APHIS is not a pesticide regulatory agency, it has no program to train and certify collar users. Before collars can be used in any state, the agency that is responsible for pesticide regulation (usually the State Department of Agriculture) must develop an EPA-approved program to train and certify collar applicators, provide collars to users, and monitor collar use. Currently (January 1990), such programs exist in five states--Texas, New Mexico, Montana, Wyoming, and South Dakota.

QUESTIONS AND ANSWERS ABOUT THE LP COLLAR

Q. Who can use LP Collars?
A. *Collars may be used only by certified Livestock Protection Collar applicators or persons under their direct supervision.*

Q. As a rancher, how can I become certified to use collars?
A. *Your state pesticide regulatory agency must establish an EPA-approved plan to train and certify collar users. To become certified, you will take a short training course followed by a written examination.*

Q. Will there be a certification fee?
A. *This will be decided by each state.*

Q. What happens if my state decides not to seek registration or certify collar users?
A. *LP Collars will not be used in your state.*

Q. Once I have been certified, where do I get collars?
A. *Each state will decide how to distribute collars, and will provide this information to you in the training session. Some states may authorize applicators to buy collars directly from the manufacturer. Others may elect to have collars distributed by the state pesticide regulatory agency or by designated distributors. Either way, applicators will only receive filled collars. Applicators will not be authorized to fill collars or to remove toxicant from them.*

Q. How much do collars cost?
A. *The manufacturer's price for unloaded collars is approximately $17 each. Prices paid by ranchers may differ from state to state due to differences in procedures established for collar distribution.*

Q. How long do collars last?
A. *Up to 2 years unless they are punctured sooner. Once punctured or ruptured, collars must be disposed of.*

Q. Will the collars freeze?
A. *Collars on Idaho sheep did not freeze at temperatures down to zero degrees F. Collars stored in unheated buildings will freeze, and the effects of freezing on collars and their contents have not been studied.*

Q. What records will collar users have to keep?
A. *Required records include:*
- *number of collars attached to livestock*
- *the pasture(s) where collared livestock were placed*
- *dates of each collar attachment, inspection, and removal*
- *numbers and locations of livestock found with ruptured or punctured collars*
- *numbers, dates, and approximate location of collars lost*
- *species, locations and dates of all suspected poisonings of humans, domestic animals, or nontarget wild animals resulting from collar use.*

Q. How often must collared livestock be inspected?
A. *All collared livestock must be checked at least once every 7 days, and collars adjusted if needed.*

Q. What if collared animals are missing?
A. *Each collared animal will be marked to permit individual identification. If any collared animal is missing on 2 consecutive checks, an intensive search for it must be made. In addition, if more than 3 collared animals are missing at any check, an intensive search for these animals is required.*

Q. Where can LP Collars be used?
A. *Collars can be used only in fenced pastures up to 2,560 acres in size (up to 10,000 acres under certain conditions). Collars cannot be used on unfenced, open range, or in any pasture where the applicator cannot monitor them properly.*

Q. What other use restrictions apply?
A. *All use restrictions are given in the EPA-approved technical bulletin. Use restrictions may differ from one state to another. Some important restrictions are:*
- *bilingual (English/Spanish) warning signs must be posted.*
- *damaged, punctured, or leaking collars must be disposed of by deep burial, or as directed in state regulations.*
- *when not in use, collars must be stored under lock and key.*
- *no more than 20 collars can be used in any 100-acre (or smaller) pasture, nor more than 50 collars in any pasture between 100 and 640 acres in size.*
- *no contaminated animal will be used for food or feed.*

Q. What provisions have been made to protect threatened and endangered wildlife?
A. *Parts of California are closed to the use of LP Collars due to possible hazards to the California condor. Written approval from a FWS Endangered Species Office is required before collars are used in certain areas where San Joaquin kit fox, black-footed ferret, northern Rocky Mountain wolf, eastern timber wolf, or grizzly bears may be present. (A complete list of counties where this regulation applies is given in the technical bulletin). Any poisoning of any threatened or endangered species must be reported to EPA.*

Q. Can I put LP Collars on calves?
A. *No. They can be used only on sheep and goats.*

Q. Will LP Collars work on my ranch?
A. *Collars will work wherever coyote predation can be*

targeted to collared sheep or goats. If your management conditions are conducive to effective targeting, you should be able to use collars effectively.

Q. What other factors should I consider in deciding whether or not to use LP Collars?

A. *You should be positive that your predation problem is due to coyotes. Collars are not legal for use against any other predator species. Each ranch should employ whatever combination of lethal and nonlethal controls is most cost effective. If other methods are doing the job, collars aren't recommended. Ranchers most likely to benefit from collar use are those who:*

(1) have at least 1 coyote kill each week,

(2) haven't been able to stop the predation by other methods, and

(3) have fences and management conditions that will permit effective targeting of coyotes to collared sheep or goats.

Q. Why is Compound 1080 used in LP Collars? Why not some other toxicant?

A. *Many other toxicants were tried experimentally-- the list includes sodium cyanide, diphacinone, methomyl, and carbofuran. Of all chemicals tested, Compound 1080 was best in terms of effectiveness, safety, and lowest hazard to humans and nontarget animals.*

Q. Are coyotes killed by 1080 collars dangerous to other animals by secondary poisoning?

A. *No. When the coyotes die, they contain such low levels of 1080 that their tissues are not hazardous to magpies, eagles, skunks, or other scavengers. In addition, stomach contents regurgitated by poisoned coyotes have very low 1080 concentrations. These facts have been established by lab analysis of 1080 concentrations in poisoned coyotes and also by feeding the tissues to scavenger species.*

Q. What about coyote-killed sheep or goats with punctured 1080 collars?

A. *Contaminated livestock carcasses definitely have enough toxicant on the wool or hair, near punctured collars, to pose a hazard to scavengers. This too was studied by allowing scavenger species (dogs, skunks, magpies, and eagles) to feed on contaminated carcasses. These species tended not to eat the wool or hair and were not adversely affected. Nevertheless, this hazard is real. Collar users must dispose of contaminated livestock remains promptly and properly.*

Q. How dangerous are LP Collars to humans?

A. *Each collar contains enough toxicant to kill several adult persons, but collar contents are not toxic unless taken internally. A person could be poisoned only by deliberately swallowing liquid from the collar. Experienced users consider LP Collars to be very safe, compared to ordinary farm hazards such as are inherent in using motor vehicles or farm machinery, for example.*

Q. Are LP Collars hazardous to livestock?

A. *An adult sheep could be fatally poisoned by eating forage contaminated with as little as 1 milliliter (1 cc) of collar contents. However, no such fatalities were seen during 5 years of experimental use. Collar use restrictions include provisions for disposal of contaminated forage.*

Q. Are LP Collars hazardous to stock dogs?

A. *If your dog punctures a collar by biting the neck of a collared sheep or goat, it probably would be poisoned. Otherwise, the hazard appears to be minimal. No rancher participating in experimental testing of LP Collars reported problems, either with herding dogs or guard dogs. Dogs should not be allowed to scavenge contaminated livestock carcasses, or to roam at large where they are likely to attack collared livestock.*

Q. What is the future of the LP Collar?

A. *The collar is just now reaching the point where it can succeed or fail on its own merits. The future of this technique will be established by the collective experience of collar users. If a substantial number of ranchers find the collar superior to other methods where coyote damage control is difficult, the collar will be a success. But if most users have poor results, the collar will fall by the wayside. The important thing is to give it a fair trial.*

REFERENCES

Connolly, G. 1989. Technical Bulletin for the Sodium Fluoroacetate (Compound 1080) Livestock Protection Collar, EPA Registration Number 56228-22. USDA, Animal and Plant Health Inspection Service, Denver Wildlife Research Center, Denver, CO. 25 pp. + 20 photos. August 1989.

Wade, D.A. 1985. Applicator Manual for Compound 1080 in Livestock Protection Collars. Texas Agricultural Extension Service, Bull. B- 1509. The Texas A&M University System, College Station, TX. 52 pp.